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NOTE.—*The application for a Patent has become void.*

This print shows the Specification as it became open to public inspection under Section 91 (3) (a) of the Acts.

PATENT SPECIFICATION

395,321

Convention Date (United States): Oct. 8, 1930.

Application Date (In United Kingdom): Oct. 6, 1931. No. 27,796/31.

Complete not Accepted.

COMPLETE SPECIFICATION.

Improvements in Captor Elements for Screws and the like.

We, UNITED AMERICAN BOSCH CORPORATION, a corporation organised under the laws of the State of New York, of Springfield, State of Massachusetts, United States of America, Assignees of JOHN FREDERICK MARTIN, a citizen of the United States of America, of 52, Eldridge Street, Springfield, County of Hampden, State of Massachusetts, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to means for holding an element captive. More particularly it is an object of this invention to provide a simple captor element and a method whereby the same may be made operative to hold a screw or the like captive in the bore of a structure in which it is to be operatively engaged.

Preferably, this captor element comprises a centrally apertured dish- or cup-shaped (concavo-convex) disc, washer or other element arranged to be upset or flattened whereby the effective diameter of the element is increased while the effective diameter of the central aperture is decreased.

One method whereby this invention may be carried out is to form a screw with a threaded portion, a head and a reduced intermediate portion. The threaded portion of the screw should be of slightly less diameter than the diameter of the central aperture in the captor element in its cup-shaped form. The element then readily will pass up the screw to the unthreaded reduced portion. The screw, with the element disposed upon it, is inserted into a bored structure for receiving it, said structure having also a counterbore in which the element (with its convex side up) may be accommodated. The screw is turned down and the pressure of the head thereof on the element causes it to flatten out and expand in its external diameter. If the wall of the counterbore is of a yielding character the element will intrude into the material of the wall and be held firmly thereby in its flattened condition. At the same time that the element itself expands, the diameter of the central role contracts to a point where it is now less than the outer diameter of the threaded portion of the screw, and the screw is thereby held captive.

The accompanying drawing illustrates the invention. Fig. 1 is a section through the cup-shaped disc; Fig. 2 is a plan view thereof; Fig. 3 is a section through the flattened disc; Fig. 4 is a plan view thereof; Fig. 5 is a sectional view of an assembly before the disc is forced into its final operative position; Fig. 6 is a sectional view of the assembly after the disc is forced into its final operative position; Figs. 7 and 8 are views similar to Figs. 5 and 6 but embodying a modification.

Referring particularly to Figs. 1 and 2, there is disclosed a preferred form of captor element. This is in the form of a disc 1 which is cup-shaped and is provided with a central aperture 2. When the cup-shaped disc is flattened the diameter of the disc increases while the diameter of the central aperture decreases, as will be seen from a comparison of Figs. 1 and 2 with Figs. 3 and 4.

Referring to Figs. 5 to 8 inclusive, there is shown an assembly of parts for carrying out my invention. A suitable structure 3 is provided with a bore 4, threaded at 5, having a counterbore 6; providing an annular shoulder for accommodating the screw or fastening member 7 and disc 1 respectively. The screw is provided with a threaded portion 9, a head element 10 and a reduced portion 11. The diameter of the central aperture in the cup-shaped disc is such (before being flattened) as to be slightly greater than the outer diameter of the threaded portion of the screw. The screw is then inserted

[*Price* 1/-]

in the bore of the structure 3 and the cup-shaped disc disposed in the counterbore, the necessary or no clearance (as the case may be) being provided between the walls of the counterbore and the periphery of the disc for the subsequent expansion of the disc.

If the structure 3 is of a yielding material, such as rubber, no or only a very slight clearance is necessary. In Figs. 5 and 6 the structure is represented as being composed of hard rubber, aluminium or other yielding material. There is therefore little or no clearance between the disc and the walls of the counterbore when the disc is first disposed in the counterbore, as clearly shown in Fig. 5. As the screw is turned down the head thereof engages the convex surface of the disc and forces it down and flattens it. As the disc is more and more flattened, it forces itself into the material of the wall of the counterbore, forming its own groove, as illustrated in Fig. 6, wherein it is held firmly in its flattened condition. The diameter of the central aperture of the disc is now less than the outer diameter of the threaded portion of the screw, so that the screw is now held captive thereby.

In the event the wall of the counterbore is unyielding, the same may be provided with a circumferential groove 12 at the seat 13 of the counterbore, Fig. 7. There need be little or no clearance between the cup-shaped disc and the wall of the counterbore. Expansion of the disc by the flattening thereof will cause it to enter the groove and be held firmly therein, as shown in Fig. 8.

In the event a structure is provided with a counterbore the wall of which is unyielding, and having no groove at the seat thereof, frictional engagement of pressure between the edge of the flattened disc and the wall of the counterbore may be relied upon to hold the disc firmly in its flattened condition. In this instance the necessary clearance will be provided between the edge of the cup-shaped disc and the counterbore wall to allow for a certain amount of the subsequent expansion while the remainder of the expansion is utilized to permit a tight frictional engagement between the edge of the flattened disc and the counterbore wall.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In combination, a yieldable concave element having an opening therein, a member passing through said opening having a portion of cross-sectional area slightly less than that of said opening, a head on said member, and a structure to receive said member, said head when said member is made fast with said structure forcing said element to bind against said structure around the periphery of said element and the edge of the opening to grip said member.

2. In combination, a structure having a bore and a counterbore, a member having a portion for engagement in said bore, and a captor element for said member arranged to be firmly seated in the counterbore by said member.

3. In combination, a structure having a bore and a counterbore, a screw for engagement therein having a head, and a captor element for said screw arranged to be firmly seated in the counterbore by said screw.

4. In combination, a structure having a bore and a counterbore, a screw for engagement in said bore having a head, and a cup-shaped washer disposed in said counterbore, the hole in which is of slightly greater diameter than the threaded portion of the screw, said washer being adapted to be flattened in said counterbore so that the same shall be firmly seated therein and the hole in said washer shall contract to such an extent that it becomes of less diameter than the threaded portion of the screw.

5. The combination with a structure having a bore with a counterbore forming an inside annular shoulder, a fastening member in the bore, a concave disc in the counterbore, the disc having an opening normally of larger diameter than that of said member, the latter passing through said opening and an element on said member compressing the disc against said shoulder when said member is made fast in said structure to cause the edge of the opening in the disc to grip said member, and the periphery of the disc to bind against the inner surface of the counterbore.

6. Captor element for screws and the like substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 6th day of October, 1931.
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and
19—25, West 44th Street, New York,
U.S.A.,
Agents for the Applicants.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1933.

Fig. 1.

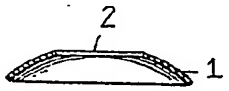


Fig. 3.

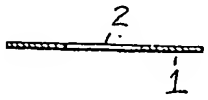


Fig. 2.

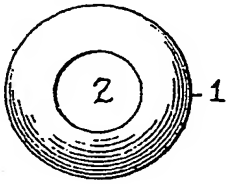
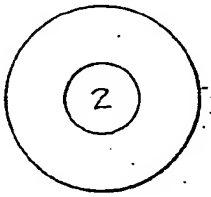


Fig. 4.



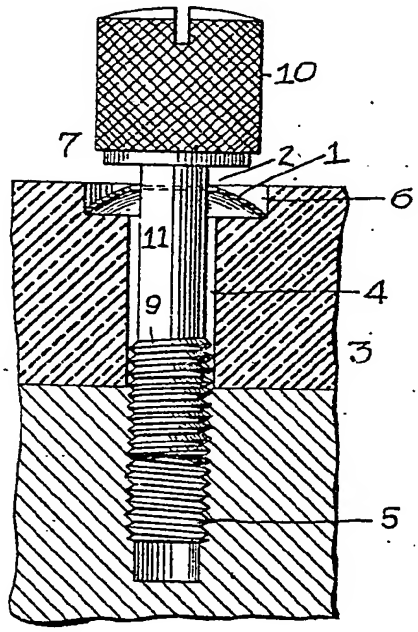


Fig. 5.

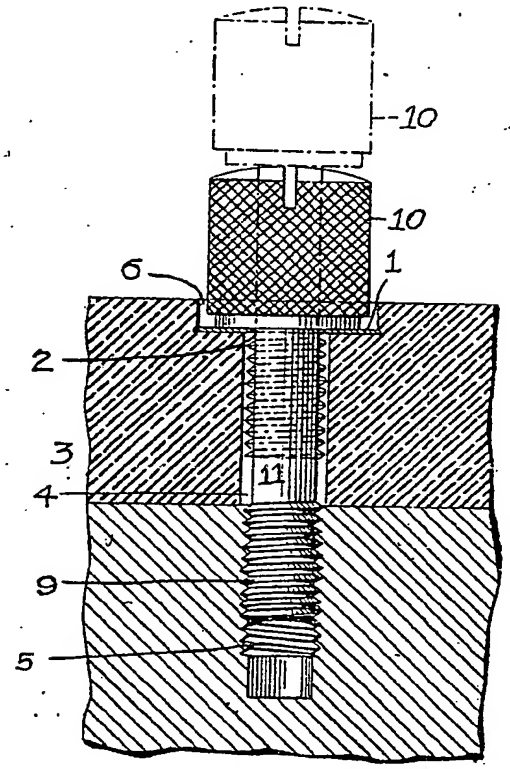
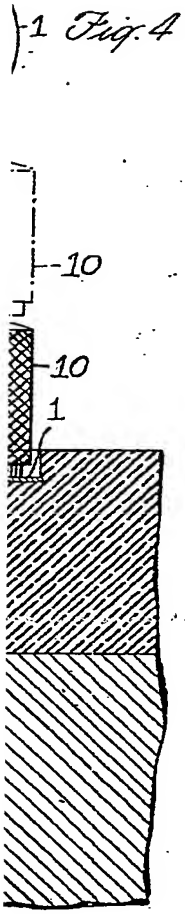


Fig. 6.

Fig. 3.



1 Fig. 4

Fig. 7.

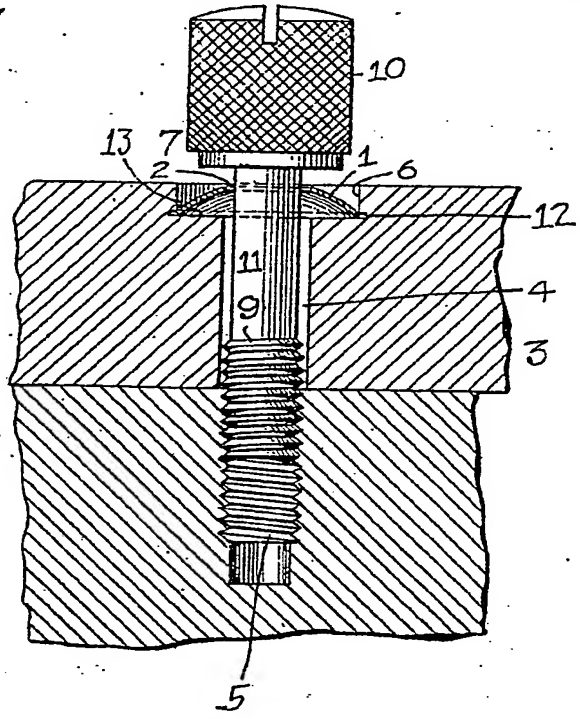


Fig. 8.

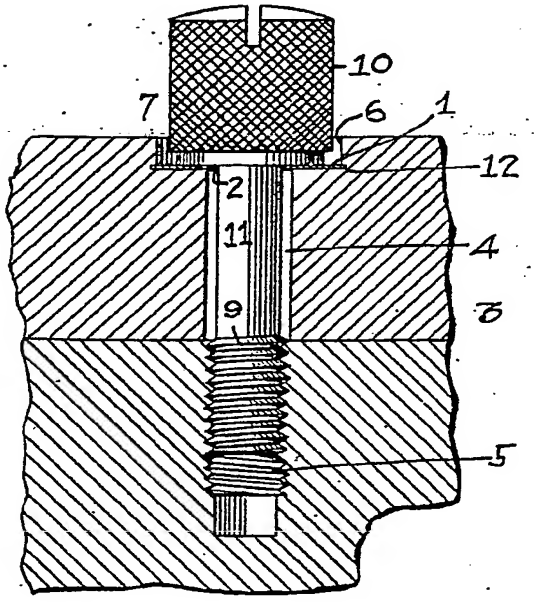


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Fig. 1.

Fig. 3.

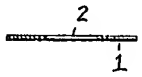


Fig. 2.

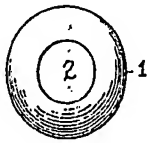
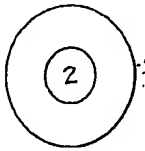


Fig. 4.



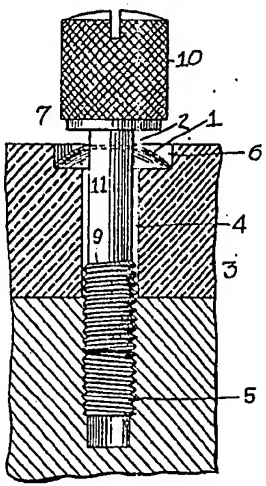


Fig. 5.

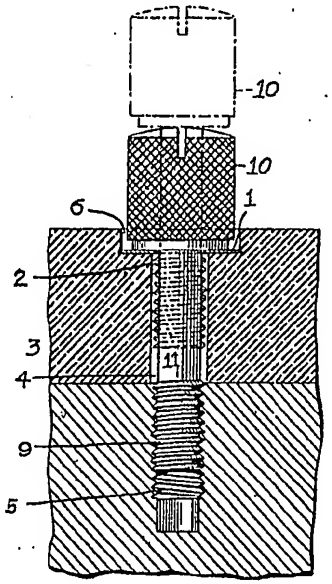


Fig. 6.

Fig. 7.

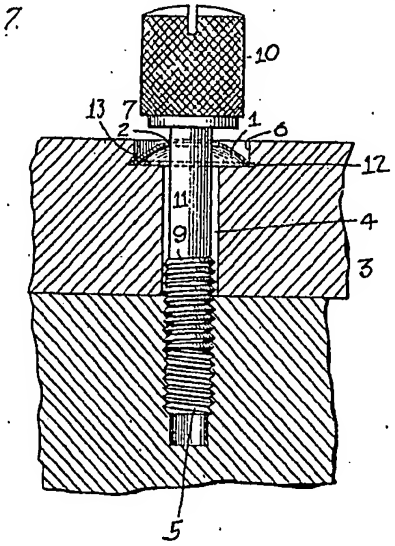
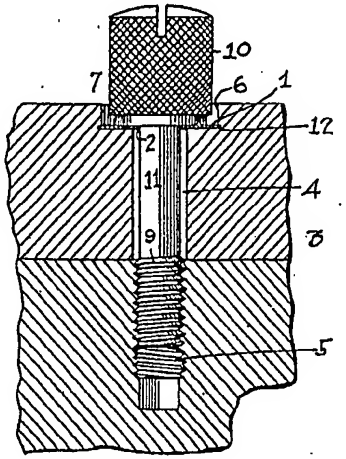


Fig. 8.



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